NATIONAL CHILD SURVIVAL AND SAFE MOTHERHOOD PROGRAMME

PROGRAMME INTERVENTIONS

CHILD SURVIVAL

MCH DIVISION
Ministry of Health and Family Welfare
Government of India
New Delhi

05773

NATIONAL HEALTH POLICY MCH GOALS

	Current Level 2000	
A. REDUCTION OF MORTALITY RATES (/1000)		
Infant Mortality Rate (1992)	79	< 60
Perinatal Mortality Rate (1991)	46	< 35
Under 5 Mortality Rate (1991)	26.5	< 10
Maternal Mortality Rate (Est. 1992)	4	< 2
B. REDUCTION IN THE PROPORTION OF LBW (%)		
Under Weight Babies (Est. 1992)	30	10
C. SERVICES (% COVERAGE)		
Immunization - Infants (1992-93)	87.6	85
- Pregnant Women	81.6	100
Deliveries by trained personals (91)	46.3	100
Antenatal care (Est. 1992)	79	100
D. PREVENTION OF BLINDN		**CY**
Blindness Control (%)		0.3

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Infant Feeding
Control of Vitamin A Deficiency
Control of Acute Respiratory Infection
Management of Diarrhoea in Children

MCH DIVISION
Ministry of Health and Family Welfare
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New Delhi
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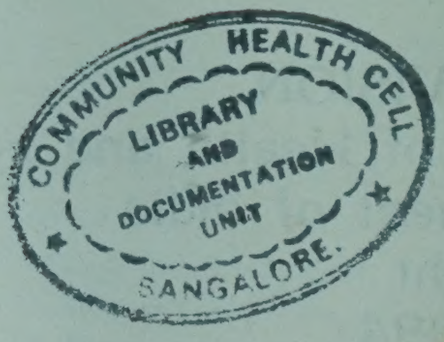

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PREFACE

One of the major goals of the National Health Policy is the reduction of the mortality rate in children under five years of age. Despite a significant decline in the rate from 41.2 per 1000 children under five years of age in 1984 to 26.5 in 1991, the rate is still far above the aimed level of 10 per 1000 children by the end of the decade.

The increase in immunization coverage levels since 1985-86, after the launching of the Universal Immunization Programme, has prevented 16.8 lakh deaths in 1992 in children under five years of age. The access to young children established under the Immunization Programme can be effectively utilized for extending the coverage with other child health interventions to further reduce child morbidity and mortality rates.

Besides vaccine preventable diseases, the other major preventable causes of deaths in children are diarrhoeal diseases and pneumonia. Malnutrition increases case fatality rates due to these diseases. Improvement in infant and child nutrition and appropriate management of diarrhoea and pneumonia, besides sustaining high immunization coverage levels, will have a significant positive impact on mortality rates. The manual details the national guidelines on exclusive breastfeeding and the management of diarrhoea and ARI in children.

INFANT FEEDING

1 EXCLUSIVE BREASTFEEDING

Breastmilk is the ideal food for the newborn child. It contains all the nutrients that a child needs. It also contains sufficient amounts of water so that a child does not require anything else, **including water**, upto the age of 4 months. Exclusive breastfeeding protects children from infections including diarrhoea and pneumonia in early infancy. **Exclusive breastfeeding can save many lives by preventing malnutrition and reducing risks of infections during early infancy when fatality rates are high.** No child should be denied the benefit of exclusive breastfeeding due to lack of information to the mother.

1.1 What is Exclusive Breastfeeding

Exclusive breastfeeding means that except for breast milk no other food or fluids, including water and prelacteal feeds, should be given to a child from birth to 4 months.

Breast milk has enough water in it to meet the hydration requirements of babies under 4 months of age even in hot and dry conditions.

Feeding anything other than breastmilk, including water, is not only unnecessary but is also harmful. It decreases milk flow and increases risk of infections.

1.2 When to Start Breastfeeding

Breastfeeding should be initiated within the first hour of birth. It should be given frequently and on demand.

It is important that the baby gets the initial breastmilk called colostrum as the first feed. Colostrum is rich in nutrients including vitamin A and also contains antibodies to protect the child against infections. Giving colostrum has been called the 'first immunization' of the child.

1.3 Advantage of Breastfeeding

- **Breastmilk is the ideal food for young infants**
  It contains all the nutrients needed for the first 4 months of life

- **Prevents malnutrition**
  Mothers produce enough milk for adequate nutrition of their babies. In exclusively breastfed babies chances of undernutrition are rare.

- **Protects Against Infections**

  Breastmilk is clean and free from bacteria. It contains protective antibodies and other anti-infective factors which help to fight infection. During the first six months of life, the risk of having diarrhoea requiring hospitalization can be 30 times greater for non breastfed babies than for those who are exclusively breastfed.

- **Bonding**

  Breastfeeding creates a close bond between a mother and the child and helps in the emotional, intellectual and social development of the child.

- **Benefits to the Mother**

  Exclusive breastfeeding has contraceptive effect in the first 4 months after delivery. Other benefits to the mother include early involution of uterus and protective effect against breast and ovarian cancer.

1.4 Role of Medical Officers

Majority of mothers in our country breastfeed. However, lack of knowledge or misconceptions about the quantity and quality of breastmilk leads to unwarranted top feeding. As a medical officer it is your duty to advise mothers about the benefits of breastfeeding.

Mothers must be assured that they are capable of providing adequate milk for the growth of their babies and that true lactation failure is rare. The best stimulus of successful lactation is frequent suckling by the baby. The baby should take the areola and nipple into the mouth and should not suck only from the nipple. When breastfeeding is done in correct position the baby takes slow deep sucks and there is audible swallowing and it causes no pain to the mother.

Feed the baby on one breast initially so that it gets the benefit of energy rich hind milk. Alternate the breast for subsequent feeding. As the baby gets older she may need to suck from both the breasts.

Contact with the women during the antenatal period and immunization sessions provides you with an opportunity to advise them regarding the benefits of exclusive breastfeeding.

During Antenatal check up

Inform about benefits of exclusive breastfeeding.

Encourage the mother to eat extra food and take rest.

Promote and monitor intake of IFA tablets.

Examine breast and nipples.

After Delivery

Put the child to the breast within the first hour of birth
Ensure feeding of colostrum
Discourage prelacteal feeds
Do not give any fluids including water
Demonstrate correct positioning
Assure anxious mothers
Encourage frequent feeding on demand.

During immunization sessions (at the time of giving the three doses of DPT and OPV)

Confirm exclusive breastfeeding
Provide help, if there is any practical problem
Give advice about weaning

In the rare instances when breastfeeding is not possible like death or severe illness of the mother, undiluted cow, buffalo or dairy milk can be used. In such cases feeding should be done with a cup and spoon. Children who are fed with animal milk need to be given water, which has been previously boiled and cooled, in between feeds. Even very small children learn to drink from a spoon. Bottle feeding should be strongly discouraged as it increases the risk of infections.

BOTTLE FEEDING SHOULD BE STRONGLY DISCOURAGED

1.5 How Long should Exclusive Breastfeeding be Continued

Exclusive breastfeeding should be practised for at least first four months. After this age, semi solids (weaning) must be started. Breastfeeding must also be continued for as long as possible but preferably until the baby is at least 1 to 2 years old.

1.6 Normal Weight Gain

It is important to monitor the weight for assessing whether the baby is getting adequate nutrition.

- A normal newborn looses weight in the first few days after birth. This loss of weight is regained by the 10th day.
- The expected weight gain of the baby is:

During the first 3 months : 200 gms per week.
During the next 3 months : 150 gms per week.

BABY DOUBLES BIRTH WEIGHT BY 5 TO 6 MONTHS AND TREBLES IT BY 1 YEAR.

- Weight increases by 2.5 kg per year between 1-2 years and by 2 kg per year between 3 to 5 years.

Breast milk alone is not enough to meet the nutritional requirements of the baby after 4 to 6 months of age. At this time semi solids should be added to the diet of the infant. Breastfeeding, however, must be continued for as long as possible. Adequate weight gain in the first year of life is very important for the future healthy growth of the child.

2 ADDITION OF SEMI SOLIDS (WEANING)

Weaning is the process of gradual and progressive transfer of the baby from breastmilk to the usual family diet. **Weaning does not imply discontinuation of breastfeeding.** Delayed or improper weaning results in malnutrition which predisposes the infants to higher risk of infections and mortality.

2.1 When to Start Weaning

After a period of 4 months of exclusive breastfeeding it is essential to add semi solids in the diet of the baby as after this age breastmilk alone may not satisfy all her nutritional needs. If at this age, weaning is not introduced the baby will not gain weight adequately.

The period between 6 months to 2 years of age is critical for the healthy growth of the child. Children are often not given the right type and full amount of food even when it is available in the house due to lack of information with the mother. Malnutrition which is common in this age group can be prevented to a large extent by informing the mother of the need to feed the children semi solids frequently and in sufficient amounts. Every contact with the health personnel should be utilized for this purpose as malnutrition predisposes the children to higher risk of infections.

2.2 What is a Good Weaning Food

In babies the stomach capacity is very small. A good weaning food should therefore provide as many calories as possible in small volumes.

DESIRABLE QUALITIES OF WEANING FOODS

- ❖ High in energy density
- ❖ Easy to digest
- ❖ Semisolid in consistency
- ❖ Low in bulk and viscosity(not too thick)
- ❖ Fresh and clean
- ❖ Affordable and easy to prepare
- ❖ Culturally acceptable

Weaning foods should not be excessively diluted (example: dal water). This reduces the energy density of the food. Small babies can easily tolerate semisolid foods. Introduce one weaning food at a time for the child to get used to it.

2.3 What Foods can be Given

Cereals, legumes, oils and fats, sugar and jaggery, vegetables and foods of animal origin can all be given to young infants and can be mixed with the staple food (rice, wheat or millet). The nutritive value can be greatly enhanced by mixing different types of foods. Addition of a little oil increases the energy value. The food that the family normally eats must be given to the child. Breastfeeding should be continued as long as possible.

WEANING
AGE RELATED GUIDELINES

❖ **4 TO 6 MONTHS**
- o Start with 1-2 teaspoons for each feed
- o Feed frequently, 5-6 times a day
- o Over 3-4 weeks, increase to half a cup or one banana a day
- o Mash all food
- o Give semisolid food, do not over dilute
- o Continue breastfeeding

❖ **6 TO 9 MONTHS**
- o Give foods normally taken by family
- o Mash all food
- o Feed frequently, 5-6 times a day
- o Continue breastfeeding

❖ **9 TO 12 MONTHS**
- o Can eat everything cooked at home but without adding spices and condiments
- o Food need not be mashed but should be soft
- o Feed about half cup, 5-6 times a day
- o Continue breastfeeding

❖ **12 TO 18 MONTHS**
- o Can eat all foods cooked in the family
- o Needs about half the amount the mother eats daily
- o Feed 4-5 times a day
- o Continue breastfeeding, especially at night

3 FEEDING DURING ILLNESS

Food intake can decrease due to poor appetite when the child is ill. In addition children are often not fed during an episode of illness, especially diarrhoea. Energy requirements of the child, however, are increased during illness.

Children should continue to be fed during an episode of illness. Feeding is physiologically sound and prevents or minimizes the deterioration of nutritional status that normally accompanies illnesses.

Children who come to the health institutions are usually malnourished. The contact with the mother should be used for advising her about appropriate feeding. If the child is under one year of age, she should be advised about breast-feeding and proper weaning. **It is important that the mother understands that the child should be fed during an episode of illness.**

The child should be given the diet which is appropriate for her age and to which she is accustomed. As the child may have a poor appetite food should be given in small volumes but more frequently. Breast-feeding should be continued uninterrupted.

Mothers should be advised to increase the frequency of feeding including breastfeeding for a few days following an episode of illness.

II. CONTROL OF VITAMIN A DEFICIENCY

1 INTRODUCTION

Vitamin A deficiency increases case fatality due to common childhood diseases and is particularly marked following measles. Reduction in prevalence and degree of Vitamin A deficiency levels are important for reducing childhood mortality and preventing irreversible blindness in children.

Surveys indicate that the intake of Vitamin A is, on an average, about half the recommended dietary intake. It is important that the dietary practices are improved and intake of Vitamin A rich foods be actively promoted. Advice on nutrition, starting with exclusive breastfeeding and weaning, is an important measure for promoting healthy growth and for reducing morbidity and mortality rates.

Night-blindness is an easily recognizable sign of Vitamin A deficiency. However, when clinical signs appear, the degree of Vitamin A deficiency is severe. A child with night-blindness needs immediate treatment with Vitamin A. Since other children in the area may also have Vitamin A deficiency (although overt clinical signs may not be apparent), coverage with Vitamin A should be assessed in the area from where a case of night- blindness has been reported. Coverage with Vitamin A should similarly be checked following outbreaks, particularly measles, since infections deplete vitamin A reserves and mortality rates are high in children with Vitamin A deficiency.

1.1 Goal

Prevent vitamin A deficiency-associated blindness in children under 5 years of age by 1997.

1.2 Strategy

- Provide vitamin A supplementation to children between 9 months to 3 years of age at six monthly intervals
- Promote exclusive breastfeeding and feeding of colostrum
- Promote intake of balanced food, including green leafy vegetables and yellow fruits
- Increase coverage with measles vaccine
- Provide additional attention and monitor areas with identified cases of night-blindness in children and areas where measles outbreaks have occurred.

2 VITAMIN A PROPHYLAXIS

Prevalence of Vitamin A deficiency is maximum between 6 months and 3 years. In addition to the risk of blindness the children with Vitamin A deficiency are at a higher risk of dying due to infections. It is therefore imperative that all children in this age group be given Vitamin A prophylaxis.

Every child between 9 months to 3 years is to be given five doses of Vitamin A.

- The first dose of 100,000 IU will be given at 9 months along with measles immunization.
- The second dose of 200,000 IU will be given at 16 months with booster dose of DPT/OPV.
- Three more doses of 200,000 IU will be given at 6 monthly intervals.

3 VITAMIN A DEFICIENCY

3.1 Diagnostic Criteria

In children who have Vitamin A deficiency the surface of cornea becomes dry and rough, and may ultimately break down partially or completely. This may lead to ulceration and permanent scarring or irreversible damage and loss of sight. Ocular signs which are associated with Vitamin A deficiency are:

Night Blindness :
The child cannot see after dark.

Xerophthalmia :
This is the drying of the conjunctiva and cornea followed by destruction of the cornea and blindness.

Bitot's Spots :
These are accumulation of foamy, cheesy material on the conjunctiva, often in association with other signs such as night blindness.

Corneal Xerosis/Ulceration :
The cornea becomes dry (xerosis) and wrinkled, devoid of the shine or gloss. If it is not treated, xerosis can progress within hours to form an ulcer of the cornea.

Keratomalacia :
If the disease is not treated, a corneal ulcer can lead to "melting" or "wasting" of the cornea (keratomalacia).

Corneal Scar :

Keratomalacia can lead to perforation of cornea resulting in a scar. The sooner the disease is treated, the smaller the ulcer and smaller the scar. If treated early, corneal scars and blindness can be prevented.

3.2 Treatment

In a child with symptoms of night blindness therapeutic doses of Vitamin A should be administered :

- ☐ Give 200,000 IU of Vitamin A immediately after diagnosis.
- ☐ Give one more dose of 200,000 IU four weeks later.

  (NOTE : Dose in infants is 100,000 IU).

- Children who have an eye lesion must be given the first therapeutic dose of Vitamin A, and **REFERRED URGENTLY FOR SPECIALIST CARE.**
- Infants and young children suffering from diarrhoea, measles or acute respiratory infections must be monitored closely. In case signs of deficiency are present treat with therapeutic doses of Vitamin A.
- Children should be encouraged to consume Vitamin A rich food.

Vitamin A solution is available in the PHC and subcentres in the form of a liquid preparation. Each ml of this contains 100,000 IU of Vitamin A.

A spoon / measure with 1 ml and 2 ml markings is provided with every bottle.

Vitamin A should be kept in a cool dark place and should not be exposed to direct sunlight.

4. SERVICE DELIVERY

- The health worker(F) and other functionaries working in the Primary Health Centres (PHC) are responsible for administering Vitamin A to children under three years. Coverage levels should be regularly monitored.
- Services of Integrated Child Development Services (ICDS) functionaries may be utilized for the distribution of Vitamin A to children in the ICDS Blocks and for the education of mothers on prevention of Vitamin A deficiency.

- Health workers must be alerted to look for and report cases of night-blindness. Areas from where a case is reported should be assessed for Vitamin A coverage levels and corrective measures taken immediately.

- In areas where an outbreak of measles has occurred an active search for cases of Vitamin A deficiency should be made. Such measures are important as early administration of Vitamin A will prevent ocular damage and blindness. No child should become blind when Vitamin A is readily available.

- Intake of easily available Vitamin A rich foods such as **green leafy vegetables** (spinach, methi, capsicum), **yellow vegetables and fruits** (carrots, pumpkin, papaya, mango, yam) and fish should be promoted. Mothers should be advised about the advantage of giving **colostrum and breastfeeding** during antenatal visits and mothers meetings.

CONTROL OF ACUTE RESPIRATORY INFECTIONS (ARI)
Pneumonia Control

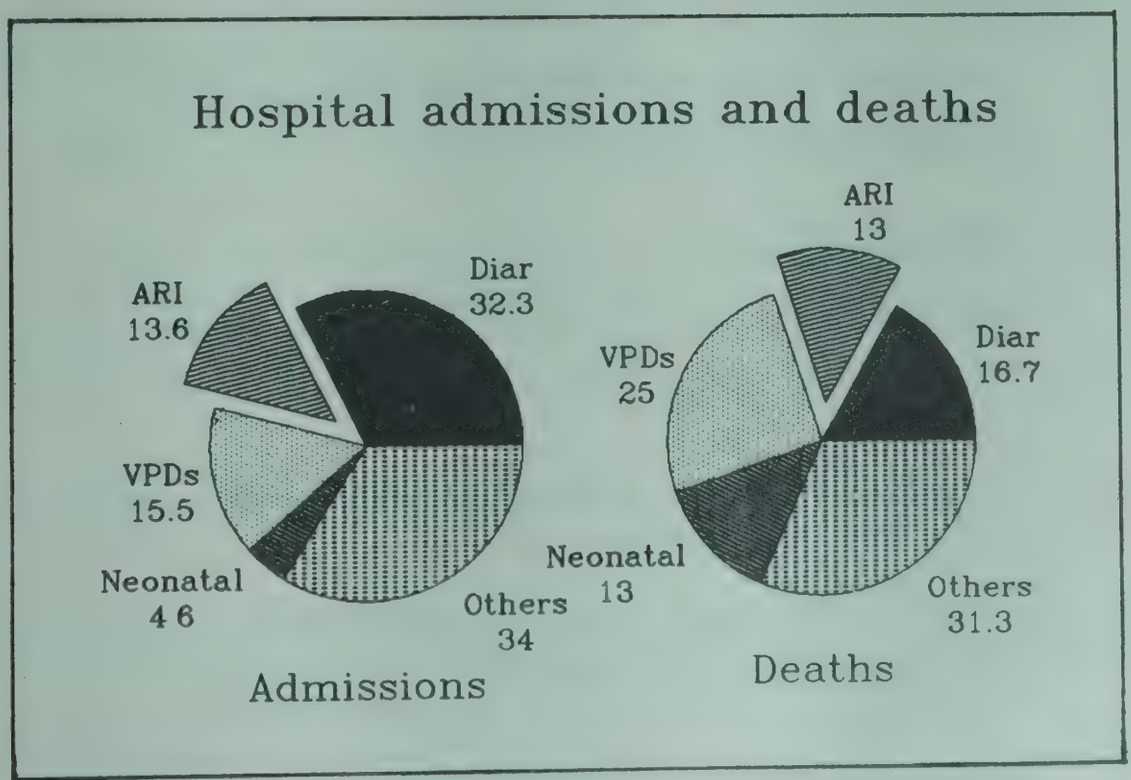
1. INTRODUCTION

In states and districts with high infant and child mortality rates, acute respiratory infections (ARI) and diarrhoeal diseases are the major causes of death. ARI and diarrhoea are also the major reasons for which children are brought to the hospitals and health facilities. Hospital records from states with high IMR show that upto 13 per cent of in-patient deaths in paediatric wards are due to ARI. The proportion of deaths due to ARI in the community is probably much higher as many children die at home.

Although majority of the ARI episodes are self-limiting, pneumonia is a serious life-threatening illness with high case fatality rates, unless treatment is started early. Deaths due to pneumonia occur because of three reasons.

- Children come for treatment, but receive poor treatment;
- Children come for treatment, but come too late;
- Children do not come for treatment.

Without effective treatment, the child may die within 3 to 5 days of onset of illness. Safe, relatively cheap and effective antibiotics are available for the treatment of pneumonia. Many lives can be saved if therapy is started early.



1.1 Goal

Reduce mortality rate due to acute respiratory infections by 20 percent by 1995 and 40 percent by 2000.

1.2 Strategy

a. Ensure standard case management of pneumonia in children under 5 years by training medical and other health personnel.

b. Train peripheral health staff to recognize and treat cases of pneumonia.

c. Promote timely referral of severe pneumonia by the peripheral health staff and community.

d. Improve maternal knowledge about home management of coughs and colds and recognition of early danger signs for seeking appropriate medical care.

e. Promote immunization, including measles immunization, exclusive breastfeeding in the first 4 to 6 months of life, ensure proper weaning and vitamin A administration.

2. ACUTE RESPIRATORY INFECTIONS IN CHILDREN

2.1 What is ARI?

ARI is an acute infection of any part of the respiratory tract and related structures including paranasal sinuses, middle ear and the pleural cavity. It includes all infections of less than 30 days duration except those of the middle ear where the duration of an acute episode is less than 14 days.

2.2 Classification of ARI

ARI is often classified by clinical syndromes depending on the site of the infection and is referred to as ARI of the upper (AURI) or lower (ALRI) respiratory tract.

- **Upper respiratory tract infections (AURI)** include common cold, pharyngitis and otitis media.
- **Lower respiratory tract infections (ALRI)** include epiglottitis, laryngitis, bronchitis, bronchiolitis and pneumonia.

Majority of ARI deaths in children are due to pneumonia. Children with pneumonia generally present with symptoms of **COUGH OR/AND DIFFICULT BREATHING**. For operational purposes these cases are categorized as:

- **No Pneumonia** : do not require antibiotics, can be treated at home.
- **Pneumonia** : treated as outpatients with oral antibiotics
- **Severe Pneumonia** : both require parenteral antibiotics
- **Very Severe Illness** : and in-patient care.

2.3 Diagnosis of Pneumonia

Pneumonia is recognized by increased **RESPIRATORY RATE. Severe pneumonia** is recognized by **CHEST INDRAWING.**

These signs have been found to be as specific and more sensitive than auscultation for the purposes of diagnosis of pneumonia.

In a child with cough or difficulty in breathing, fast breathing indicates pneumonia. Fast breathing and chest indrawing, indicate severe pneumonia. Chest indrawing even when present alone indicates severe pneumonia.

❖ **FAST BREATHING**	:	PNEUMONIA
❖ **FAST BREATHING AND CHEST INDRAWING**	:	SEVERE PNEUMONIA
OR		
❖ **CHEST INDRAWING ALONE**		

Age, nutritional status, and history of other infections, influence the severity of pneumonia. Inability to drink, excessive drowsiness, presence of convulsions, cyanosis and apnoea indicate a very severe illness or disease.

3. CLINICAL ASSESSMENT

3.1 History

- How old is the child?
- Does the child have cough? If yes, for how long ?
- Have there been any antecedent illnesses such as measles?
- Does the child have any other complaints, such as diarrhoea?
- Does the child have fever?
- Is she eating and drinking well or has there been a refusal or inability to eat or drink, since the onset of the present illness?
- Is the child excessively drowsy or difficult to wake? If yes, for how long?
- Did the child have convulsions?
- Did the mother notice irregular breathing, short periods of not breathing or the child turning blue?
- History of treatment during for this episode of illness.

3.2 Physical Examination

3.2.1 Fast Breathing

- Count respiratory rate for one full minute using the second's hand of the wrist watch.
- Count the respiratory rate by looking at the abdominal movement or the lower chest. The chest and abdomen must be exposed for counting.
- Count the respiratory rate in a quiet area when the child is calm or asleep.

Increased respiratory rate is of significance only if it persists. Respiratory rate should always be counted a second time in children below 2 months of age. In older children a second count can be made after 10 minutes of the first count when in doubt or in cases with marginal increase in respiratory rate.

Fast breathing is present when the **Respiratory rate** is :

- ❖ **60 or more** in a child **less than 2 months**
- ❖ **50 or more** in a child **2 to 12 months**
- ❖ **40 or more** in a child **12 months to 5 years**

3.2.2 Chest Indrawing

Chest indrawing is defined as a definite inward movement of the lower chest wall while breathing IN (inspiration).

- The child should be observed lying flat in the bed or in the mother's lap.
- A child is said to have a definite chest indrawing only if it is persistent. If in doubt, chest indrawing should be observed in different postures.
- Intercostal or supraclavicular retractions in which only the soft tissues between the ribs or above the clavicle goes in is NOT chest indrawing. A normal child under 2 months of age may have mild chest in-drawing because of soft chest wall.

TABLE -1

CLINICAL CLASSIFICATION OF PNEUMONIA AGE 2 MONTHS - 5 YEARS

	Therapy	Where to treat
PNEUMONIA **Respiratory rate Age** (per minute) (months) o 50 or more 2 - 12 o 40 or more 12 - 60	Cotrimoxazole Oral	Can be treated at home/ health facility
SEVERE PNEUMONIA o Chest Indrawing	Antibiotics Intramuscular	Patient should be hospitalized
VERY SEVERE ILLNESS o Inability to drink o Excessive drowsiness o Stridor in calm child o Respiratory grunting o History of apnoea cyanosis, convulsions o Severe malnutrition o Hypothermia	Chloramphenicol Intramuscular	Must always be admitted and treated at a health facility with provision of oxygen

NOTE : Children less than two months who have fast breathing are always treated as for severe pneumonia and their assessment and management is discussed separately.

3.2.3 Signs of Very Severe Illness

- Refusal or decreased acceptance of feeds in a child less than 2 months and inability to drink in a child 2 months - 5 years, are suggestive of very severe illness. This is important if it is related to the current illness.
- Excessive drowsiness and difficulty to wake is an early sign of hypoxia due to pneumonia or may indicate encephalopathy or meningitis.
- Respiratory grunting is a short gruffy sound that an infant makes at the beginning of expiration . This indicates respiratory difficulty and is a sign of hypoxia.
- Wheezing is a whistling sound produced while breathing OUT (expiration). A child with wheeze takes longer to breathe out and has to make an extra effort. It occurs when the airflow from the lungs is obstructed due to the narrowing of small airways. Wheezing is generally associated with bronchiolitis, bronchial asthma and foreign body inhalation. When present in a child with pneumonia (fast breathing and chest in-drawing) it is an additional sign of very severe illness.
- Stridor is a harsh noise made while breathing IN (inspiration). It is caused by inflammation of the larynx, trachea or the epiglottis. Stridor when present in a calm child indicates very severe illness.
- Cyanosis is a sign of hypoxia. Cyanosis must be checked in good light. In an anaemic child with hypoxia, cyanosis may be masked.
- Convulsions may be due to hypoxia caused by pneumonia, meningitis or encephalopathy .

MALNUTRITION when present is a high risk factor and case fatality rates are higher in such children. In severely malnourished children with pneumonia, fast breathing and chest indrawing may not be as evident as in other children. A severely malnourished child may have an impaired or absent response to hypoxia and a weak or absent cough reflex. These children need careful evaluation for pneumonia as well as careful management.

3.3 Radiology and Laboratory Investigations

Chest X-ray is not recommended routinely to confirm pneumonia in a child who has fast breathing and/or chest indrawing. These signs are sufficient for diagnosis of pneumonia for immediate treatment with antibiotics which must be started early to be effective.

Laboratory investigations like WBC count and its differential, ESR, C-Reactive proteins do not differentiate sufficiently between cases of viral and bacterial pneumonia and are not useful in guiding the need or the choice of antibiotic therapy. For routine cases laboratory investigations are not required.

4 MANAGEMENT OF A CASE OF PNEUMONIA

4.1 Pneumonia (child with cough and fast breathing)

Although viral pneumonia are known, they are relatively less frequent in the developing countries. Majority of the cases of pneumonia in children are bacterial. *Streptococcus pneumoniae* and *Hemophilus influenzae* are the most common organisms in cases of pneumonia, among children aged 2 months to 5 years. These organisms are sensitive to cotrimoxazole.

Cotrimoxazole is the drug of choice for the treatment of pneumonia. Studies carried out in India have confirmed the efficacy of cotrimoxazole to be similar to ampicillin and procaine penicillin and cure rates of up to 95% have been recorded. Cotrimoxazole is less expensive with few side effects and can be used safely by health workers at the peripheral health facilities and at home by the mothers. Cotrimoxazole has been included as one of the drugs provided to the sub-centres in the drug kit 'A' under the CSSM Programme and health workers are being trained in the CSSM districts, for recognition of signs of pneumonia, treatment of simple cases and referral of severe cases.

Children who have pneumonia should be treated with cotrimoxazole in the doses recommended in Table 2 for 5 days.

- The condition of the child should be assessed after 48 hours. Cotrimoxazole should be continued for another 3 days in children who show IMPROVEMENT in the clinical condition.

- If there is no significant change in condition (NEITHER IMPROVEMENT NOR WORSENING), cotrimoxazole should be continued for another 48 hours and condition reassessed.

- If at 48 hours or earlier the condition WORSENS, chest indrawing or other signs of severe illness (inability to drink, excessive drowsiness, convulsions or cyanosis) appear, the child should be hospitalized immediately.

The mothers must be told to look for signs of severe pneumonia and to bring the child for assessment for further treatment:

- ☐ Difficult breathing
- ☐ Chest indrawing
- ☐ Not able to drink
- ☐ Excessively drowsy and difficult to wake
- ☐ Condition gets worse than before.

TABLE 2

TREATMENT OF PNEUMONIA Daily dose schedule of COTRIMOXAZOLE for five days		
AGE / WEIGHT	**Paediatric tablet** Each tablet : Sulphamethoxazole 100 mg and Trimethoprim 20 mg	**Paediatric syrup** Each spoon (5 ml) : Sulphamethoxazole 200 mg and Trimethoprim 40 mg
< 2 months* (Wt. 3-5 kg)	One tablet twice a day	Half spoon (2.5 ml) twice a day
2-12 months (Wt. 6-9 kg)	Two tablets twice a day	One spoon (5 ml) twice a day
1-5 years (Wt.10-19 kg)	Three tablets twice a day	One and half spoon (7.5 ml) twice a day.

NOTE :

a. If Paediatric tablets are not available the daily dose of adult single dose tablet (containing Sulphamethoxazole - 400 mg and Trimethoprim - 80 mg), is a quarter, half and three-fourths of a tablet, per dose, to be given twice a day, for the three age-groups, respectively.

b*. In a child less than two months, cotrimoxazole is not routinely recommended. These children are to be treated as for severe pneumonia. However, in case of delay in referral cotrimoxazole may be initiated.

c. Cotrimoxazole should not be given to premature babies and cases of neonatal jaundice. Such children when seen by a health worker must be referred to a health facility.

d. In small children the tablet should be crushed and mixed with milk or other fluids. The mixture should be given to the child with a spoon.

EXERCISE A

Jyoti is 10 months old. Her mother tells you that she has cough and difficult breathing since 3 days. Although Jyoti is not eating well she is able to drink. Jyoti has a respiratory rate of 72 per minute and axillary temperature of 39.4 deg. C. She has no chest indrawing. There is no stridor or wheeze. Her nutritional status appears normal. Although she resents examination, she is otherwise alert.

a) List all signs of Jyoti's illness in the space below:

b) What is Jyoti suffering from ? Give reasons for your decision.

c) What laboratory investigations would you like to do?

d) What treatment would you prescribe for Jyoti's illness?

4.2 Serve Pneumonia (chest indrawing)

Children with severe pneumonia should be treated as inpatients with intramuscular injections of benzyl penicillin (after test dose), ampicillin or chloramphenicol. The condition of the child MUST be monitored every day and REVIEWED after 48 hours for antibiotic therapy.

- If there is IMPROVEMENT
  - Change to one daily injection of procaine penicillin, if the child was initially put on benzyl penicillin (after test dose).
  - In case the child was initially put on IM ampicillin or chloramphenicol change to oral administration of the same antibiotic.

- If the condition WORSENS OR DOES NOT IMPROVE after 48 hours
  - Switch over to chloramphenicol IM, if benzyl penicillin was used initially.
  - If chloramphenicol IM was used as the initial antibiotic, then change to intramuscular injections of cloxacillin and gentamicin.

Antibiotic therapy must be given for a minimum of 5 days and continued for at least 3 days after the child gets well. In case the child is put on cloxacillin and gentamicin the treatment should be continued for at least 3 weeks, since in such cases the child may be suffering from staphylococcal infection.

- Treat fever and wheezing if these symptoms are present.

- Fluid and food intake should also be carefully monitored.

- On discharge of the child from the hospital, the mother should be advised on home care.

4.3 Very Severe Illness

Children with signs of very severe illness are in imminent danger of death, and should be treated in a health facility, with provision for oxygen therapy and intensive monitoring, as these cases require supportive therapy in addition to specific treatment of pneumonia. Chloramphenicol IM is the drug of choice in all such cases. The therapeutic efficacy of chloramphenicol IM in the recommended dose equals that achieved with IV administration of chloramphenicol.

TREAT FOR 48 HOURS

- **If condition IMPROVES**
  Switch over to oral chloramphenicol.Chloramphenicol should be given for a total of 10 days.

- **If condition WORSENS or DOES NOT IMPROVE after 48 hours**
  Switch to IM injections of cloxacillin and gentamicin. Treat with these antibiotics for 3 weeks.

TABLE - 3

TREATMENT OF SEVERE PNEUMONIA (2 months-5 years)			
Antibiotics	**Dose***	**Interval**	**Mode**
A. First 48 hours			
Benzyl penicillin	50000 IU per KG/dose	6 hourly	IM
or			
Ampicillin	50mg/KG/dose	6 hourly	IM
or			
Chloramphenicol	25 mg/KG/dose	6 hourly	IM
B 1. If condition IMPROVES, then for the next 3 days, Give :			
Procaine penicillin	50000 IU/KG (maximum 4 lac IU)	Once	IM
or			
Ampicillin	50mg/KG/dose	6 hourly	Oral
or			
Chloramphenicol	25 mg/kg/dose	6 hourly	Oral
B 2. If NO IMPROVEMENT, then for the next 48 hours : CHANGE ANTIBIOTIC			
❖ If ampicillin used change to chloramphenicol IM;			
❖ If chloramphenicol used, change to cloxacillin 25mg/kg/dose,every 6 hours along with gentamicin 2.5 mg/Kg/dose , every eight hours.			
❖ If condition improves continue treatment orally			
C. Provide symptomatic treatment for fever and wheezing, if required			
D. Monitor fluid and food intake			
E. Advise mother on home management on discharge			

* The doses can be rounded off to the nearest administrable dose.

Treat with antibiotics for at least 5 days. Continue treatment for at least 3 days after the child recovers. If cloxacillin and gentamicin are used the treatment should be for at least 3 weeks.

EXERCISE B

Mohan is six month old. His mother tells you that Mohan has cough and difficulty in breathing for the past 2 days. On examination you find his respiratory rate to be 60 per minute and chest indrawing is present. Mohan's temperature is 39.6 deg.C. Mohan is alert, does not have stridor or wheezing. Mohan is undernourished but is able to drink.

a. List Mohan's signs of illness in the space below.

b. What is Mohan suffering from?

c. In the space below write the treatment you would prescribe forMohan.

When you reviewed Mohan the next day you find his respiratory rate has come down to 50 per minute. Chest indrawing is still present. He is, however, unable to drink, is excessively sleepy and difficult to wake.

a. List additional signs which have appeared.

b. Would you like to revise your diagnosis at this stage, if so why?

c. How would you treat Mohan now?

4.4 Pneumonia in Young Infants under 2 Months of Age

Cough may not be a presenting symptom in children less than 2 months of age. Pneumonia in this age group is recognized by fast breathing and/or chest indrawing as in the older infants and children.

In this age group pneumonia must always be considered to be severe as the condition of the child can deteriorate very quickly. Many of the cases may have added risk factor of low birth weight. Such children are very susceptible to temperature changes and even in tropical climates, deaths due to cold stress or hypothermia are common.

It is difficult to differentiate between severe pneumonia, sepsis or meningitis in this age group, as the clinical presentation is very similar. The treatment in these conditions is, however, basically the same.

These children must be HOSPITALIZED. Treatment with cotrimoxazole may be started by the health worker before referring the child .

If pneumonia is suspected in young infants, they should be treated with intramuscular injections of Benzyl penicillin or Injection Ampicillin, along with Injection Gentamicin. Chloramphenicol is not recommended as the first line of treatment in young infants.

TABLE - 4

TREATMENT OF PNEUMONIA IN CHILDRENAGED LESS THAN 2 MONTHS			
ANTIBIOTIC	DOSE	FREQUENCY	
		Age < 7 days	Age 7 days to 2 months
Inj. Benzyl Penicillin	50000 IU/kg/dose	12 hourly	6 hourly
or			
Inj. Ampicillin	50 mg/kg/dose	12 hourly	8 hourly
AND			
Inj. Gentamycin	2.5 mg/kg/dose	12 hourly	8 hourly

Besides antibiotics, therapy for the associated conditions, if any, must be instituted immediately. The children must be kept warm and dry.

Breastfeeding must be promoted strongly as children who are not breastfed are at a much higher risk of ARI and diarrhoea. In such children the illness is more severe and case fatality rates are higher.

5 MANAGEMENT OF AURI (NO PNEUMONIA)

Many children with presenting symptoms of cough, cold and fever do not have pneumonia (no fast breathing or chest indrawing) and DO NOT require treatment with antibiotics.

Antibiotics are not recommended for coughs and colds because:

- Majority are caused by viruses and antibiotics are not effective
- Increase resistant strains
- Cause side effects while providing no clinical benefit
- Wasteful expenditure.

Symptomatic treatment and care at home is generally enough for such cases. The mothers must be advised on how to take care of the child at home.

The essential elements of home care are:

- Feeding of the child should be continued during illness and the frequency of feeding increased after recovery to prevent malnutrition. If the child is being breastfed, this must be continued.
- The intake of fluids should be increased.
- Fever should be treated with paracetamol.
- If the nose is blocked and interferes with feeding or breathing, the mucous can be cleaned by using saline drops or a moist wick. Medicated nasal drops should not be used as these can be harmful.
- For soothing the throat and relieving cough, home remedies such as lime, honey, ginger, tulsi and warm water can be used. These should, however, not be given to infants under 2 months.
- Commercially available cough syrups, cold remedies or antibiotics do not alter the duration of cold or cough. Neither do these prevent pneumonia or otitis media.
- The mothers must be informed to look for signs of pneumonia and other signs of severe illness and to bring the child for examination and treatment with antibiotics if required:
  - ☐ Fast breathing
  - ☐ Difficult breathing
  - ☐ Not able to drink
  - ☐ Excessively sleepy and difficult to wake
  - ☐ Condition gets worse than before.

6 IRRATIONAL DRUGS FOR COUGHS AND COLDS

Although, commercially available drugs are expensive these are still widely used. Such drugs have no clinical efficacy and some are even harmful. Many commercial drugs contain a mixture of an antihistamine, cough suppressant, oral decongestant and expectorant. Formulations containing atropine, codeine, alcohol, promethazine or other antihistamines may sedate the child or interfere with her feeding and her ability to clear secretions. Medicated nose drops can cause systemic toxic affects (because the medication is absorbed) and when stopped the child can have nasal discharge again (rebound rhinorrhoea). **THESE DRUGS SHOULD NOT BE USED.**

7. MANAGEMENT OF A CASE WITH WHEEZING

Wheezing occurs when the airflow from the lungs is obstructed due to narrowing of the small airways. It may be caused by infections as in the case of pneumonia or due to allergic response as in asthma.

A child with wheezing may present as a case of:

- Wheezing without any accompanying respiratory distress
- Wheezing accompanied with respiratory distress
- Recurrent wheezing (Asthma)

A. Management of a case without any respiratory distress.

These children can be treated at home with ORAL salbutamol, given in the following dosages:

- For children less than 10 kg
  Give 1 mg, every 8 hours
- For children 11-19 kg
  Give 2 mg, every 8 hours.
- Treatment with oral salbutamol is usually not necessary for more than a few days

B. Management of a case with respiratory distress and those with recurrent wheezing (Asthma).

A rapidly acting bronchodilator should be given as indicated at Table-5

TABLE - 5

RAPIDLY ACTING BRONCHODILATORS	
Nebulized Salbutamol (5mg/ml)	0.5 ml Salbutamol plus 2 ml of sterile water; may repeat after 20 minutes
Subcutaneous Epinephrine (adrenaline) (1: 1000 = 0.1 percent)	0.01 ml per Kg body weight; may repeat after 20 minutes
Subcutaneous Terbutaline	0.1 mg/Kg body weight may be repeated after 30 minutes upto a maximum of 3 times. (Total 0.3 mg)

* Assess after 30 minutes of the last administration. If the child responds well, treat at home with oral salbutamol.
* In case , respiratory distress persists, REFER to a hospital for admission and treatment.

8. ADVISE TO THE MOTHER

Majority of the cases of pneumonia do not need in-patient care and can be treated at home. Even children who may be hospitalized have to be taken care of by the mothers at home after discharge. The mother plays a key role in the treatment of the child with cough and cold. It is therefore very important that the mother understands the basic principles of home treatment.

As a part of treatment of a child it is your duty to advise mothers on management at home. Mothers must be advised on:

- How to give the antibiotic in proper dosage.
- Adequate feeding including breast feeding in younger children. Since the child may not take food willingly, small and frequent feeds should be advised.
- Signs that will tell her whether the child is getting better or worse. She should be able to recognize the DANGER SIGNS when she MUST bring the child for treatment. Failure to recognize the signs may cost the child his life. EXPLAIN THE DANGER SIGNS TO THE MOTHER. The signs include the following :

  - ☐ Difficult and rapid breathing
  - ☐ Chest indrawing
  - ☐ Refusal of feeds (in infants)
  - ☐ Eating or drinking poorly
  - ☐ Excessive sleepiness
  - ☐ Convulsions.

- Inform the mother of the precautions that she can take to reduce the risks of pneumonia:
  - ☐ Keeping young infants warm and away from draught
  - ☐ Exclusive breastfeeding up to 4 months of age
  - ☐ DPT and measles vaccination at the appropriate age
  - ☐ Hand washing before feeding and touching the child, especially young infants.

- Also REMIND the mother of the immunization schedule and the prophylactic doses of Vitamin A so that these are completed in time.

MAKE SURE THAT THE MOTHER HAS UNDERSTOOD

Children with pneumonia and other infections need special care and attention from their mothers. Women with sick children, are often in poor health themselves and anaemia is widely prevalent. Such women need birth spacing as a health measure. The contact established with the women should be used to COUNSEL them to adopt birth spacing in the interest of their own and their children's health.

EXERCISE C

1. The two important signs for recognizing pneumonia among children are:

   ....

2. A child 10 months of age has fast breathing, if his respiratory rate is more than :

   40 per minute
   50 per minute
   60 per minute
   None of the above.

3. Majority of Pneumonia among children in India are viral in Origin.

   True ( )

   False ( )

4. The drug advocated in the outpatient treatment of Pneumonia in the ARI Programme is :

   Amoxycillin.
   Erythromycin.
   Cotrimoxazole.
   Cephalosporin.

5. Auscultation of chest is the most sensitive and specific method for diagnosing a case of Pneumonia

   True ( )

   False ( )

6. To diagnose Pneumonia, Respiratory rate should be counted for :

   ..... Seconds.

7. Chest Indrawing may be a normal feature among children

   2 months - 12 months
   less than 2 months
   Above 1 year
   It is always abnormal.

8. Minimum duration for which antibiotics should be given in a case of Pneumonia is :

   ..... days

9. For management of cough which of the following should be prescribed.

   Anti-histaminics — Cough suppressants
   Home Remedies. — Cough expectorants.

10. What home care instructions would you give to the mother of a child aged 4 months, suffering from pneumonia.

ARI CASE RECORD FORM

Registration No. ..... Admission Date ..... Time .....

Discharge date ..... Time .....

Name ..... Father's Name .....

Age ..... Years ..... Months ..... Sex .....

HISTORY

Cough/Difficult ..... yes/no breathing.

Duration ..... Days.

Fever ..... yes/no

refusal to feed/.....Yes/no. Drink

Convulsions..... yes/no

Any episode of turning blue or not breathing.....yes/no

Any other complaints.....

ASSESSMENT

General Condition ..... Child alert/excessively sleepy/Unconscious.

Malnutrition ..... yes/no Weight .....

Respiratory rate ..... /minute(check for full one minute).

Fast Breathing ..... yes/no (give rate per minute .....)

Chest Indrawing ..... yes/no

Wheezing ..... yes/no

Stridor ..... yes/no

Cyanosis ..... yes/no

Able to drink

(offer water).....yes/no

Any other relevant Findings.....

Diagnosis.....No Pneumonia/Pneumonia/Severe Pneumonia/Very severe illness, with .....

TREATMENT

Sent home with Advise / Admit or Refer for admission.

Sent home with Advise (No Pneumonia/Pneumonia) :-

Feeding /Breast feeding.
Fluids
Cleaning of Nasal passage
Treat for fever if present.
Advise on danger signs (When to bring the child back)

.....

Advice for antibiotics .....

.....

Advise on repeat visit .....

Treatment for Admitted Cases

PROGRESS OF THE PATIENT

AT DISCHARGE, ADVISE MOTHER ON HOME MANAGEMENT

Home Fluids .....

Foods to offer .....

Early Signs of referral .....

(when should she come back)

Any other advise .....

Immunization Status/Advise .....

Spacing for the next child .....

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MANAGEMENT OF DIARRHOEA IN CHILDREN

1 INTRODUCTION

One in four deaths in children under the age of 5 years are estimated to be due to diarrhoea. The mortality rates can be significantly reduced by the early use of oral rehydration salts (ORS) and home available fluids (HAF) and by continued feeding. Standard case management of diarrhoea in children is a major intervention under the Child Survival and Safe Motherhood (CSSM) Programme, for the reduction of infant and child mortality rates.

1.1 Goal

Reduce diarrhoea associated mortality in children under the age of 5 years, by 30 percent by 1995 and by 70 percent by 2000.

1.2 Strategy

- Ensure standard case management of diarrhoea (including dysentery and persistent diarrhoea) by training medical and other health personnel.
- Promote standard case management practices among private practitioners.
- Improve maternal knowledge on home management of diarrhoea and recognition of danger signs for seeking immediate medical care.
- Increase availability of ORS by providing free ORS packets at the health facilities and outreach depots. Increase accessibility by marketing ORS through the Public Distribution System and commercial outlets.
- Monitor hospital based data on ORS use, case fatality rates and other parameters.
- Promote exclusive breastfeeding for the first 4 to 6 months, proper weaning, infant immunization (including measles immunization and Vitamin A prophylaxis).

2 DEFINITION OF DIARRHOEA

2.1 What is Diarrhoea

Diarrhoea is the **passage of loose liquid or watery stools**. These liquid stools are usually passed more than three times a day. However, it is the recent change in consistency and character of stools rather than the number of stools that is more important. Passage of even one large watery stool in a young child may constitute diarrhoea.

DEFINITION OF DIARRHOEA

- ❖ Three or more loose or watery stools in a day
- ❖ Change in consistency and character of stools

2.2 WHAT IS NOT DIARRHOEA

- Passage of frequent formed stools.
- Passage of pasty stools in breast-fed infants.
- Passage of a stool during or immediately after feeding due to initiation of gastrocolic reflex.
- Transitional stools on the third to seventh day of life.

In most cases the mother knows what is an abnormal stool for her child.

2.3 TYPES OF DIARRHOEA

CLASSIFICATION OF DIARRHOEA
(by clinical syndromes)

- ❖ Acute watery diarrhoea
- ❖ Dysentery (blood in the stools)
- ❖ Persistent diarrhoea

2.3.1 ACUTE WATERY DIARRHOEA

Acute watery diarrhoea starts suddenly and is characterized by passage of loose watery motions. Most episodes of acute diarrhoea recover within three to seven days. More than three fourths of all diarrhoeal episodes in the community are acute watery episodes.

2.3.2 DYSENTERY

This is diarrhoea with visible blood in faeces. The presence of blood may also be accompanied with abdominal cramps, fever, anorexia and rapid weight loss.

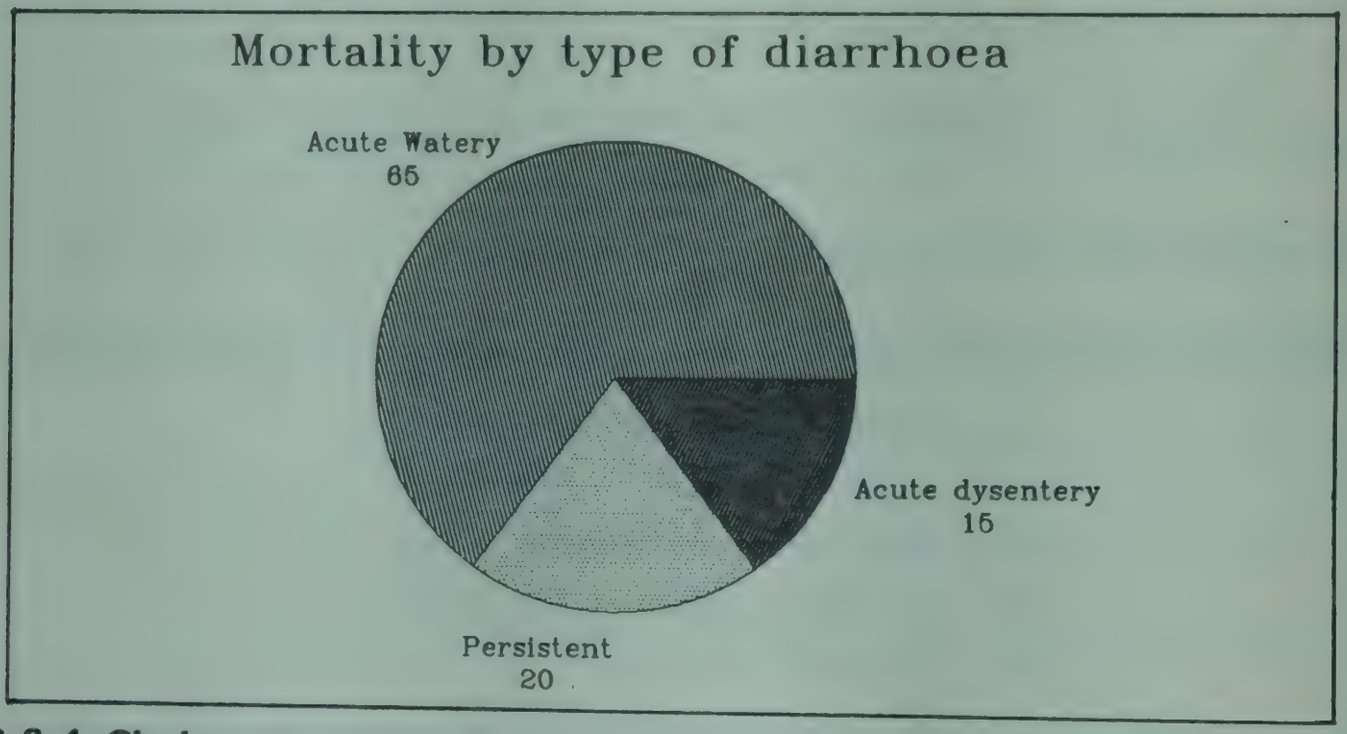
2.3.3 Persistent Diarrhoea

An acute episode of watery diarrhoea or dysentery may last upto 14 days. If it persists longer, it is classified as persistent diarrhoea. These cases require careful management.

PERSISTENT DIARRHOEA

- ❖ Acute watery diarrhoea and dysentery
- ❖ Lasts for more than 14 days
- ❖ Associated with weight loss

The relative contribution to diarrhoea-associated mortality in children under 5 years of age by each type of diarrhoea is shown in the figure below.



2.3.4 Cholera

Cholera is a form of acute watery diarrhoea. Recognizing cholera early is important in order to start treatment promptly. If treatment is delayed or is inadequate, death may occur quickly from dehydration and circulatory collapse.

- **Cholera should be suspected :**
  - ☐ when a patient older than 5 years of age develops severe dehydration from acute watery diarrhoea (usually with vomiting).
  - ☐ in any patient who comes with symptoms of acute watery diarrhoea from an area where there is an outbreak of cholera.

2.4 Consequences of Diarrhoea

The two serious consequences of diarrhoea are **dehydration and malnutrition.**

2.4.1 Dehydration

Diarrhoea leads to loss of water and electrolytes (sodium, chloride, potassium and bicarbonates) from the body. Dehydration occurs when these losses are not replaced adequately. This can lead to shock and death.

SIGNS OF DEHYDRATION
(two or more signs including at least one marked *)

- **Restlessness, irritability***
- **Increased thirst***
- **Decreased skin turgor***
- Dry mouth and tongue
- Tears absent
- Sunken eyes

SIGNS OF SEVERE DEHYDRATION

- Lethargic or unconscious, floppy
- Unable to drink

2.4.2 Malnutrition (undernutrition)

Diarrhoea has a significant negative impact on nutritional status of the child. Even a brief episode of diarrhoea leads to the loss of 1 to 2 per cent of body weight. Undernutrition in diarrhoea occurs due to loss of nutrients and because children are not given enough food during the episode.

3. CLINICAL ASSESSMENT OF CASES.

The clinical assessment of the child is done to determine whether the child has diarrhoea or not, type of diarrhoea, degree of dehydration (no signs of dehydration, signs of dehydration and signs of severe dehydration) and whether there are any other associated problems. The age of the child, weight (if possible) and nutritional status of the child should be noted.

3.1. Does the child have diarrhoea?

3.2 What is the frequency and duration of diarrhoea?

3.3 If yes, what is the type of diarrhoea?

- Acute watery
- Dysentery
- Persistent diarrhoea
- Cholera

3.4 Does she have signs of DEHYDRATION?

(Presence of **two or more signs including at least one highlighted)**

- **Restlessness, Irritability**
- **Increased thirst (Check by offering water to the child)**
- **Decreased skin turgor**
- Dry mouth and tongue
- Tears absent
- Sunken eyes

3.5 If dehydration is present, is it SEVERE?

(reflected by the following signs in addition to the signs of dehydration mentioned above)

- **Lethargic or unconscious, floppy**
- **Unable to drink**

3.6 Does she have any other associated problem? (fever, malnutrition)

3.7 Does she have other infections?

- Respiratory infection (pneumonia)
- Septicaemia

3.8 Laboratory Investigations

Clinical assessment is sufficient to initiate appropriate therapy. Routine determination of the etiology of diarrhoea in a laboratory is neither necessary nor practical. Stool culture is of little value in the routine management of diarrhoea. The management of a case of diarrhoea is based on the clinical features of the disease.

4. PRINCIPLES OF THE MANAGEMENT OF ACUTE DIARRHOEA

4.1 Fluid Replacement

Watery diarrhoea requires fluid and electrolyte replacement irrespective of the etiology. ORS is the best solution available for fluid and electrolyte replacement. In the early stages of diarrhoea or when ORS packets are not immediately available, home available fluids (HAF) and water can be used.

4.2 Feeding

Feeding must be continued during all types of diarrhoea to the extent possible, and **should be increased during recovery** so as to avoid any adverse effects on the nutritional status.

4.3 Rational Use of Drugs

ORS is the drug of choice for all cases of diarrhoea. It is life saving when used timely, in adequate quantities.

- Only a small proportion of the cases of diarrhoea (dysentery, cholera and associated illnesses) need specific antimicrobials (Table 5).
- Amoebiasis and giardiasis are rare in children and drug therapy should be started **only when** trophozoites of ***E. histolytica*** or ***Giardia*** are seen in the faeces.
- Anti diarrhoeals (anti-motility drugs, binding agents, stimulants, steroids and other drugs) have no place in the treatment of diarrhoea and must not be used. Since anti-diarrhoeals have no clinical benefits and are potentially dangerous, their marketing has been banned in India.

5 FLUID THERAPY

Fluid and electrolyte replacement is necessary for all types of diarrhoea and is the mainstay of the treatment of a case with diarrhoea. ORS is the best available solution for fluid and electrolyte replacement. In the early stages of diarrhoea or when ORS packets are not immediately available, home available fluids (HAF) and water can be used.

PURPOSE OF FLUID THERAPY

- ❖ Provides for normal daily intake
- ❖ Replaces on-going losses
- ❖ Corrects deficits

A. HOME AVAILABLE FLUIDS

Home Available Fluids(HAF) are appropriate for a child who does not show any overt signs of dehydration and should be given frequently and also after each loose stool to prevent dehydration. A good HAF is one which is safe when used in large quantities. Some of these fluids which are commonly used in the homes and have a sound physiological basis are;

- Food based solutions like, rice water, dal or dal water with salt, and butter milk (lassi) with salt.
- Other fluids which can be used are lemon water, soups, coconut water and plain water.
- Water is a good home available fluid if taken with food.

These fluids are generally more effective when given along with food (i.e. feeding should be continued), thus providing for starch (ultimately glucose) and protein (ultimately amino acid), to promote absorption of luminal sodium. These fluids together with food provide Oral Rehydration Therapy (ORT). In younger infants breast feeding is an ideal fluid and should be frequently given.

- Soft drinks, sweetened fruit juices and sweetened tea should not be used. These have a high osmolarity and can lead to worsening of dehydration.

B. Oral rehydration salts (ORS) is a balanced mixture of glucose and electrolytes for use in treating and preventing dehydration, potassium depletion and base deficit due to diarrhoea. Glucose in ORS helps in transporting sodium and water across the intestinal membrane during diarrhoea.

The ORS supplied under the national programme has a light blue colour and the national LOGO. If ORS from other sources are used, the packet should be checked to confirm that it has the right composition. Packets with a high glucose content (more than 20 gm per Litre), should not be used as these can lead to osmotic diarrhoea and worsen the condition of the child. Packets containing colouring and sweetening agents like saccharine should also not be used.

COMPOSITION OF ORS (Net Weight = 27.9 gm)

Ingredient (gm.)	Weight
Sodium chloride IP	3.5
Potassium chloride IP	1.5
Sodium citrate IP	2.9
Glucose anhydrous IP	20.0

5.1 Cases With No Signs of Dehydration

In early stages, when fluid loss is less than 5% of the body weight, children may not show any clinical signs of dehydration, but may still have sub-clinical or incipient dehydration. The purpose of fluid therapy in such cases is to prevent dehydration by giving HAF or ORS. ORS should, however, be advised to all such cases when they are brought to the health facilities and the mothers must be advised on how to prepare ORS solution and how much ORS should be given. The quantities of fluids to be given are shown in Table 1.

TABLE-1

HOW MUCH ORS TO GIVE FOR REPLACEMENT OF ONGOING STOOL LOSSES TO **PREVENT DEHYDRATION**

Age	**After each liquid stool**
<6 months	Quarter glass (50 ml)
7 months - 2 years	Quarter to half glass (50 to 100 ml)
2 to 5 years	Half to one glass (100-200 ml)

- Mothers must be told to continue giving additional quantities of home available fluids (HAF) or ORS solution as long as diarrhoea lasts.
- Breastfeeding must be continued (if in the appropriate age group). In exclusively breastfed babies frequent breastfeeding is usually enough to prevent dehydration.
- If milk other than the mother's milk is being consumed, this should not be diluted.
- Food normally taken by the child should be continued.

If the child is brought to the health facility check for signs of dehydration and start fluid therapy. Give prepared solution of ORS.

A packet of ORS should be given and the mother before she goes home and she should be told how to prepare ORS solution. DO NOT FORGET TO ADVISE THE MOTHER TO GIVE ORS, HAF, TO CONTINUE FEEDING THE CHILD AND TO LOOK FOR EARLY DANGER SIGNS OF DEHYDRATION.

5.2 Cases With Signs of Dehydration

Children who have dehydration should be kept under observation in the hospital/health centre for a few hours and given a prepared ORS solution during this period.

- The purpose of fluid therapy in such cases is to correct fluid deficit and to provide for ongoing losses and normal daily requirement.
- **During the first 4 hours, the child should receive 100 ml per kg of body weight of ORS.** The quantities of ORS solution to be given by age and weight of the child is shown in Table 2.

TABLE 2

REHYDRATION THERAPY

Approximate amount of ORS solution to be given in the first 4 hours*

Age**	<4 months	4-11 months	12-23 months	2 - 4 years	5-14 years
Weight (kg)	<5	5-8	8-11	11-16	16-30
ORS (ml)	200-400	400-600	600-800	800-1200	1200-2200
Measure (glass)	1-2	2-3	3-4	4-6	6-11

* If the child wants more ORS than shown, give more.
** Inform mother to give the child breast milk in between the feeds of ORS.
*** For infants who are not breastfed, also give 100-200 ml. clean water during this period

- If the child **vomits**, wait for 10 minutes and then continue to give ORS, but more slowly.
- If the child develops **puffiness of the eyelids**, stop ORS, Continue to give plain water (or breastmilk). Give ORS as for maintenance therapy (Table I) after the puffiness disappears.

After 4-6 hours of treatment with ORS solution, the child should be reassessed for signs of dehydration. If the child has improved (as will happen in most cases), put the child on maintenance therapy as indicated in Table I.

If the child still has some signs of dehydration after 4 hours of fluid therapy with ORS, then continue therapy with ORS solution for another 4 hours. However, before starting therapy:

- Inform mother to give the child breastmilk in between the feeds of ORS.

- **If the child is not breastfed, give 100 - 200 ml of water, before starting the therapy with ORS.** After rehydration has been achieved, ORS must be continued for replacement of ongoing losses (maintenance therapy) as indicated in Table I.

If the condition of the child improves with therapy but the mother has to leave before the child is fully recovered, then:

- Give enough of the prepared ORS solution to feed the child on the way home.

Before the mother leaves the hospital two packets of ORS should be given and the mother told how to use the packet. DO NOT FORGET TO ADVISE THE MOTHER TO GIVE ORS, HAF,TO CONTINUE FEEDING THE CHILD AND TO LOOK FOR EARLY DANGER SIGNS OF DEHYDRATION.

HOW TO PREPARE ORS SOLUTION FROM A ONE LITRE PACKET

Mothers must be taught on how to measure one litre of water. It is important that **a measure which is commonly available in the houses is identified and the mothers told the exact number of such measures that will make 1 litre.**

There is no need to boil the water for preparing the ORS solution. Clean water which the household normally uses for drinking purposes can be used.

Hands must be washed with soap before making the ORS solution.

Full packet of ORS must be used. Generally the mothers will tend to save a part of the packet in order to use it later. It is important to emphasize that the whole packet is to be mixed in one litre of water.

The container should be kept covered. The solution can be used for 24 hours and should be discarded if not consumed within this period. Fresh solution should be prepared, if required.

SHOW THE MOTHER HOW TO GIVE ORS SOLUTION

Give at least one tea spoonful every 1-2 minutes (may use a glass or cup and allow the child to drink directly).

Give frequent sips from a cup for an older child.

If the child vomits, wait for ten minutes, then give the solution more slowly.

If diarrhoea continues after ORS packets are used up tell the mother to give Home Available Fluids and get more ORS packets from the health centre.

5.3 Cases With Signs of Severe Dehydration

Children with signs of severe dehydration must be admitted for in-patient care.

A child with severe dehydration is lethargic, floppy or unconscious. The children may also be unable to drink. These signs appear when the fluid and electrolyte losses are excessive. The condition of the child in such cases is critical and it is essential that the child is **rehydrated quickly by using intravenous (IV) infusion.** IV therapy may also be required in cases where ORT has proved to be in-effective in correcting dehydration.

A number of IV solutions are available in the market. However, most of them do not contain the optimal amounts of the electrolytes required to correct the deficits associated with acute diarrhoea. The IV infusions recommended for use during acute diarrhoea are:

Preferred Solutions - Ringers Lactate solution (also called Hartmans solution for injection).

Acceptable Solutions - Normal saline and half normal saline with 5% dextrose

Unsuitable Solutions - Plain glucose (Dextrose).

The amount of fluid required when IV infusions are to be used, can be calculated, based on 100 ml of the solution per kg weight of the child. The rate of administration of IV fluids is important and is indicated at Table 3.

After signs of severe dehydration disappear and the child is able to drink, **further therapy should be continued with ORS** as given at paras 5.1 and 5.2.

Before the mother leaves the hospital two packets of ORS should be given and the mother told how to use the packet. DO NOT FORGET TO ADVISE THE MOTHER TO GIVE ORS, HAF,TO CONTINUE FEEDING THE CHILD AND TO LOOK FOR EARLY DANGER SIGNS OF DEHYDRATION.

TABLE 3

RATES AND QUANTITIES OF IV INFUSION FOR CORRECTING SEVERE DEHYDRATION

AGE	FIRST GIVE 30 ML / KG IN	THEN GIVE 70 ML / KG IN	TOTAL 100 ML/KG
Infants	First hour	Next 5 hours	6 hours
Older Children	First 30 minutes	Next 2½ hours	3 hours

Note :

- During IV therapy, the patient must be reassessed every 1-2 hours. If hydration is not improving, give IV infusion more rapidly.
- If the patient can drink, administration of ORS solution must also be started along with the IV Infusion.
- The patient must be evaluated after the completion of the therapy (100 ml/kg body weight). If signs of severe dehydration have disappeared, continue treatment with oral therapy. If signs of severe dehydration persist, IV fluid therapy must be continued.
- If it is not possible to start the IV infusion for some reason, the patient can be given ORS solution through a naso-gastric tube.

6 FEEDING IN DIARRHOEA

Children should continue to be fed during diarrhoea. Feeding should also continue while the child is being rehydrated with ORS solution.

- Feeding is physiologically sound and prevents or minimizes the deterioration of nutritional status that normally accompanies such illness.

- Children who come to health institutions with diarrhoea are usually children who are malnourished. The contact with the mother should be used for advising her about appropriate feeding.
- It is important that the mother understands that the child should continue to be fed during episodes of diarrhoea. Children with diarrhoea usually have a poor appetite and may need to be coaxed to eat; they should, however, not be force fed.
- Milk should not be diluted with water during any phase of acute diarrhoea. Milk can also be given as milk cereal mixtures, e.g., dalia, sagoo, milk-rice mixture. This reduces the lactose load while preserving energy density.
- Energy dense foods with least bulk, which are routinely available in the households should be given to the child, in small quantities but frequently, at least once every two-three hours interval. To make foods energy dense these can be enriched with fats and oil or sugar, e.g., khichri with oil, rice with milk or curd and sugar, mashed banana with milk or curd, mashed potatoes with oil and lentils.
- Breastfeeding should be continued uninterrupted even during rehydration with ORS.
- If the child is under one year of age, mother should be advised about breastfeeding and proper weaning.
- Infants, if not breast-fed, may be given undiluted cow or buffalo milk together with semi-solid foods after correction of dehydration.
- After the child recovers and normal appetite reappears, the child may be given more food than normal to regain lost weight. In the case of breastfed babies, mothers should be advised to increase the frequency of breast feeding during and for a few days following the episode of diarrhoea.

7 DYSENTERY (BLOOD IN THE STOOLS)

Dysentery, although less common than acute watery diarrhoea, is important because of associated systemic complications, adverse nutritional impact and a high fatality rate.

Early and appropriate antibiotic therapy decreases case fatality rates and reduces the duration of anorexia and malabsorption. However, if there is only mucous and no visible blood, children should be treated as for acute diarrhoea without antibiotics.

Most of the cases with complaints of blood in the stools are due to infection with Shigella.

The treatment of a child with dysentery should follow the algorithm given at Table 4. Trimethoprim - sulfamethoxazole (TMP - SMX) (cotrimoxazole) is the drug of choice and is given in two divided doses as shown in Table 5.

In addition to antibiotics, rehydration therapy and continued feeding are important elements of treatment.

TABLE 4

A SUGGESTED FLOW CHART FOR TREATMENT OF DYSENTERY

Diarrhoea

❖

Blood in Stool

❖

Treat with Cotrimoxazole

❖

Treat Fever with Paracetamol

❖

Give ORS and continue feeding

❖

Observe daily for 2 Days

❖

Patient Well or Definitely Improving

❖	❖
Yes	No
❖	❖
Continue therapy	Treat with Nalidixic Acid
❖	❖
Monitor Weight Response	Monitor Weight Response

Improvement in the condition of the child is indicated by disappearance of fever and blood in stools. Diarrhoea takes 2-3 days to cease after disappearance of blood even when therapy is appropriate.

Before the mother leaves the hospital two packets of ORS should be given and the mother told how to use the packet. DO NOT FORGET TO ADVISE THE MOTHER TO GIVE ORS, HAF,TO CONTINUE FEEDING THE CHILD AND TO LOOK FOR EARLY DANGER SIGNS OF DEHYDRATION.

TABLE 5

ANTIMICROBIAL USED IN THE TREATMENT OF SPECIFIC CAUSES OF ACUTE DIARRHOEA IN CHILDREN		
CAUSES	DRUG(S) OF CHOICE	ALTERNATIVE
Cholera	Doxycycline 6 mg/kg/day in a single dose x 3 days OR Tetracycline 50 mg/kg/day in 4 doses daily x 3 days	Erythromycin 30 mg/kg/day in 3 doses x 3 days
Shigella dysenter	Paediatric cotrimoxazole 1 tablet twice a day x 5 days (under 2 months) 2 tablets twice a day x 5 days (2-12 months) 3 tablets twice a day x 5 days (1-5 years of age)	Nalidixic Acid 55 mg/kg/day in 4 doses x 5 days
Acute intestinal amoebiasis	Metronidazole* 30 mg/kg/day in 3 divided doses x 5-10 days	
Acute giardiasis	Metronidazole* 15 mg/kg/day in 3 divided doses x 5 days	

* Tinidazole can also be used.

8 PERSISTENT DIARRHOEA

If acute watery diarrhoea or dysentery lasts for 14 days or more, the diarrhoea is classified as persistent.

The important causes of persistent diarrhoea are:

- Persistent infection with some intestinal pathogens.

- Malabsorption, particularly of carbohydrates and fat following mucosal damage by pathogens or malnutrition
- Rarely, dietary protein intolerance.

The treatment of persistent diarrhoea is similar to acute watery diarrhoea and dysentery, as described earlier. Diet forms an important part of the treatment of a child with persistent diarrhoea. Mothers should be advised on appropriate feeding of the child.

8.1 Diet in Persistent Diarrhoea

Diet is the **most important** part of the management of cases of persistent diarrhoea. Since the child may not be able to take food in adequate amount, it is necessary to give small amounts of energy rich food, frequently. Food given to the child should contain cereals, legumes, milk or curd and some oil. Eggs (boiled and mashed added to the basic cereal) are a good source of energy and protein and may be included in the food of the child.

With adequate intake of food the child should gain weight. In case this does not happen or any of the following signs appear, it suggests treatment failure.

- Dehydration
- Severe abdominal distension or other intestinal complication
- Severe weight loss continues for several days despite adequate intake
- Diarrhoea persists after 6 days of treatment with poor weight gain

Children in whom the above signs appear and children less than 6 months old with persistent diarrhoea should be hospitalized.

DIETS FOR PERSISTENT DIARRHOEA
1. **Low Milk Diet** Cereal + milk (or curd) + oil
2. **Animal milk free diet** Cereal + legume + oil
3. **Starch free diet** Glucose + oil + protein*

* egg, pureed chicken

9 DIARRHOEA ASSOCIATED WITH OTHER ILLNESSES

Children with diarrhoea may also have other potentially serious illnesses. Some of the common illnesses associated with diarrhoea are measles, pneumonia and fever.

9.1 Measles with Diarrhoea

One of the common complications of measles is diarrhoea. Diarrhoea is usually severe following measles. Prevention of measles by vaccinating children between 9 to 12 months of age, will prevent many cases of diarrhoea.

The treatment of diarrhoea following measles is similar to the practices described earlier. The child should be examined for signs of Vitamin A deficiency. If such signs are present, treatment should be started with therapeutic doses of vitamin A.

9.2 Pneumonia and Diarrhoea

Children with severe dehydration may also have fast breathing. Pneumonia should be suspected if the respiratory rate is greater than 40 per minute (children above one year of age); more than 50 per minute for children between 2 m to 12 months of age and more than 60 per minute for children younger than 2 months. The breathing pattern improves rapidly as dehydration is corrected if there is no pneumonia.

If the child has pneumonia, the recommended treatment for pneumonia should be started.

9.3 Fever and Diarrhoea

Fever is frequent in patients with diarrhoea. Treat fever with paracetamol. It is not appropriate to give antibiotics to patients with diarrhoea simply because they have fever.

10 ADVICE TO THE MOTHER

The mother plays a key role in the treatment of the child. She is responsible for feeding and caring for the child. Even children who are hospitalized and on oral therapy will be largely looked after by her. Majority of the cases do not need in-patient care and can be treated at home. It is therefore very important that the mother understands the basic principles of treatment. She must understand that additional fluids and ORS will save her child's life and that these must be given in adequate quantities to be effective. The mothers must also be told that the child must get adequate food. This must be given in small quantities at frequent intervals as the child may have a poor appetite.

When the child is leaving the facility, DO NOT FORGET TO ADVISE THE MOTHER TO GIVE ORS, HAF AND TO CONTINUE FEEDING THE CHILD.

The mothers must know how to prepare an ORS solution and how much of ORS to give to the child. Unless this message is clear, treatment will not be adequate and the child may develop dehydration. Mothers must be told that ORS will prevent and treat dehydration and that diarrhoea will take some time to recover. ORS should be continued as long as diarrhoea lasts.

MAKE SURE THAT THE MOTHER HAS UNDERSTOOD

Majority of the cases will recover if they are given adequate amounts of fluids. The mother must, however, be able to recognize the signs when she should return immediately for treatment if these appear. Failure to recognize the signs may cost the child her life. EXPLAIN THE SIGNS TO THE MOTHER. These signs include the following:

- Presence of blood in stools
- Many watery stools
- Repeated vomiting
- Marked thirst
- Eating or drinking poorly
- Fever
- Floppy, difficult to wake, unconscious

Inform the mother of the precautions that she can take to reduce the risks of diarrhoea:

- Exclusive breastfeeding up to 4 months of age
- No bottle feeding
- Measles vaccination at 9 to 12 months of age
- Hand washing before feeding, cooking meals and after going to the toilet with soap and water or with burnt ash
- Use of freshly cooked food for feeding infants and young children
- Use of clean drinking water
- Appropriate measures for disposal of faeces of the young child.

Also, REMIND the mother of the immunization schedule and the prophylactic doses of Vitamin A so that these are completed in time.

Children with diarrhoea and other infections need special care and attention from their mothers. Women with sick children, are often in poor health themselves and anaemia is widely prevalent. Such women need birth spacing as a health measure. **The contact established with the women should be used to COUNSEL them to adopt birth spacing in the interest of their own and their children's health.**

11 ENSURING ORS AVAILABILITY AT VILLAGE LEVEL

This is one of your important responsibilities. ORS availability has to be ensured 24 hours a day in the villages. Wherever ICDS is in operation, keep some packets with the Anganwadi worker. These packets should be replenished by the health worker from time to time. In other areas the local village elders or the existing depot holders for chloroquine, contraceptives or the local leaders could be involved for this purpose. It is your duty to identify a suitable functionary with the help of the Health Workers.

MAKE SURE THAT THE PEOPLE ARE AWARE ABOUT THE SOURCE OF ORS IN THEIR AREA

12 CASE MANAGEMENT AT HEALTH FACILITIES.

Cases who come with signs of dehydration at your health facilities (sub-centres,PHCs and CHCs) have to be kept at the health facility for 4-6 hours and treated with a prepared solution of ORS. For this purpose it is considered useful to earmark a suitable area in your health facility. The space required would depend on the case load. A small corner in the OPD or any other suitable area in the health facility is generally enough for this purpose. While earmarking such an area it should be ensured that ;

- Mothers can sit comfortably while giving ORS to their children.
- The space is near a toilet or a washing facility, where mothers can clean the child and wash their hands before feeding them.
- ORS solution is prepared daily and kept in the area. It should be readily available to the mother when required.
- The area is close to your work place so that you can assess the patient at frequent intervals.
- A health worker should demonstrate the preparation of ORS to the mothers and talk to them on feeding and other aspects of home care.

EXERCISE

1. Two important consequences of diarrhoea among children under the age of 5 years are ;

   ....

2. Laboratory analysis of stools is necessary for clinical management of a child with diarrhoea ;

   True / False

3. In acute diarrhoea the primary concern is to rapidly replace losses of water and which three of the following ;

1. Potassium	2. Zinc	3. Iron	4. Calcium
5. Bicarbonate	6. Phosphates	7. Magnesium	8. Sodium

4. Diarrhoea which lasts for more than 14 days is called ;

   .....

5. Treatment with ORS will stop diarrhoea ;

   True/False

6. The principles of management of a case of diarrhoea include; Fluid therapy; Rational use of drugs ; and .....

7. In a child having diarrhoea with dehydration feeding should be;

   a. Stopped for 24 hours
   b. Started after diarrhoea stops
   c. Should be continued during therapy with ORS.
   d. Started after the rehydration therapy except in breastfed babies.

8. For making the ORS solution, select the most practical one from the following

   a. Sterile water
   b. Distilled water
   c. Clean drinking water
   d. Boiled and cooled water.

9. What are the specific indications in which antimicrobials can be used

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in a child suffering from diarrhoea.

....

....

10. Antiemetics are useful in clinical management of diarrhoea associated with vomiting.

    True / False

11. After how many hours should the prepared solution of ORS be discarded and fresh solution prepared.

    6 hours / 12 hours / 24 hours

12. The three important things to advise to a mother on home management of diarrhoea are ;

    Increased fluids, feeding and .....

13. The formulation of ORS advocated in the CSSM Programme, contains;

    .... gm/ltr

    .... gm/ltr

    .... gm/ltr

    .... gm/ltr

14. Glucose in ORS is used ;

    a. for its caloric value
    b. to make the solution sweet and palatable
    c. to help absorption of sodium
    d. all of the above.

15. The most common organism which causes dysentery in children is;

    a. Ent. histolytica
    b. Campylobacter jejuni
    c. Rota virus
    d. Shigella sp.

DIARRHOEA CASE RECORD FORM

Registration No. ..... Admission Date ..... Time .....

Discharge date ..... Time .....

Age ..... Years ..... Months ..... Sex .....

Duration of Diarrhoea ..... Days. Blood seen in stools ..... Yes/No

Fever ..... Yes/no. Current Temperature .....

Check for Signs of Dehydration

Any two of the following signs, **including at least one among those marked (*).**

Child restless/Irritable*	**Yes/no**
Increased Thirst*	**Yes/no**
Decreased Skin Turgor *	**Yes/no**
Mouth and Tongue Dry	Yes/no
Tears absent	Yes/no
Sunken Eyes	Yes/no

Check for Signs of **Severe dehydration**
(presence of following signs in a dehydrated child).

Child floppy, lethargic or unconscious	Yes/no
Unable to drink	Yes/no
Decide degree of dehydration	No dehydration/dehydration/ Severe dehydration

Signs of Severe Malnutrition

Any associated illness

DIAGNOSIS WITH DEGREE OF DEHYDRATION .....

Weight of the Child ..... kg.

TREATMENT

ORS/IV INFUSION.

Quantity of ORS in the first 4 hours ..... ml.

Quantity of IV solution.

Infant : in first 1 hour ..... next 5 hours .....

Older
Children : in first 30 mts ..... next 2.1/2 hrs .....

Other drugs to be given.

Foods to be given during treatment (including breast milk)?

PROGRESS OF THE PATIENT

After 4 hours

Quantity of ORS consumed.

No of stools passed.

Vomiting.

Assess for hydration status.

Decision taken. Child well and sent home.
still dehydrated, degree .....
Treatment continued with

ORS.....

IV infusion .....

Other.....

AT DISCHARGE HAVE YOU ADVISED THE MOTHER ON HOME MANAGEMENT

Fluids .....
Foods to offer .....
Early Signs of referral .....
Prevention of Diarrhoea .....
Immunization status/Advise .....
Spacing for next child .....

GLOSSARY

Crude Birth Rate (CBR)	$\frac{\text{Number of live births during the year}}{\text{Mid-year Population}}$	X 1000
Crude Death Rate (CDR)	$\frac{\text{Number of deaths during the year}}{\text{Mid-year Population}}$	X 1000
Infant Mortality Rate (IMR)	$\frac{\text{Number of infant deaths during the year}}{\text{Number of live births during the year}}$	X 1000
Still Birth Rate (SBR) (IMR)	$\frac{\text{Number of still births during the year}}{\text{Number of live births + still births during the year}}$	X 1000
Peri-natal mortality Rate (PMR)	$\frac{\text{Number of still births + infant deaths of less than 7 days during the year}}{\text{Number of live births + still births during the year}}$	X 1000
Neo-natal mortality Rate (NMR)	$\frac{\text{Number of infant deaths of less than 28 days during the year}}{\text{Number of live births during the year}}$	X 1000
Post Neo-natal Mortality Rate (PNMR)	$\frac{\text{Number of infant deaths of over 28 days during the year}}{\text{Number of live births during the year}}$	X 1000
Age-specific Mortality Rate (ASMR)	$\frac{\text{Number of deaths in a particular age-group}}{\text{Mid-year population of the same age-group}}$	X 1000